

## Letter to the Editor: "Indwelling Central Venous Catheter-Related Sepsis"

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In a recent paper Daghistani and co-workers [1] state that staff education on proper handling of indwelling central venous catheters (ICVC) is probably the most effective factor in preventing catheter-related sepsis.

In our opinion, ad hoc education should be extended to all individuals performing such at-home procedures. In a previous study involving 584 Broviac catheters [2] we demonstrated an incidence of 0.59 ICVC-related sepsis/1000 catheter days, similar to that reported in other studies involving a large number of ICVC [3–5]. Moreover, in the same period, we observed a statistically significant increase of ICVC-related bacteremias due to Gram-negatives [6,7]. 64% of the isolated pathogens belonged to strains considered as infusate or antiseptic contaminants [8,9]. These findings occurred in the absence of changes in management of Broviac catheters or of epidemic clusters, and while survey cultures of in-hospital infusates were always negative. Since the procedure for catheter maintenance was similar for in- and out-of-hospital settings except for the means of preserving the heparin "mother" solution, we speculated that catheter manipulation at-home could play an important role in the pathogenesis of the epidemiological changes we observed. This hypothesis could have been confirmed by cultures of the heparin used by the parents at home. However, our center is a tertiary care center for pediatric hematology/oncology and bone marrow transplantation, and many patients come afar. It would be very difficult to perform cultures of heparin or other infusates, which generally are left at-home. Therefore, since it was impossible to perform these cultures, we decided only to modify the guidelines for at-home catheter management. We recommended that parents store the heparin "mother" solution at 4°C for a period not longer than 7 days after opening the vial. After this modification in catheter manipulation in the period July 1993–December 1995 we documented 113 episodes of bacteremias, 40 of which (35%) were classified as ICVC-related: 30 (75%) related to Gram-positives, 8 (20%) to Gram-negatives, and one each to fungi and polymicrobial. Previously (January 1989–June 1993) we had documented 148 episodes of bacteremia, 50 of which (34%) considered ICVC-related: 16 (32%) due to Gram-positives, 20 (40%) to Gram-negatives, 7 (14%) to fungi and mixed-polymicrobial. While there was no change in the overall

incidence of ICVC-related bacteremias (40/133, 35%, in the period July 1993–December 1995 vs 50/148, 34%, in the period January 1989–June 1993), the difference in the proportion of pathogens responsible for ICVC-related bacteremias was statistically significant,  $P = 0.003$ . Noteworthy, after changes of at-home catheter management, 5 out of 8 episodes due to Gram-negatives and the episode of mixed-polymicrobial etiology were observed in children followed in other Centers and coming to our Hospital at the time of their first febrile episode. Moreover, 2 of these patients presented in very poor hygienic condition with malfunctioning catheters that had been managed at home by the parents in the last 2 weeks before admission. The patient with polymicrobial ICVC-related septicemia had also a crushed catheter improperly repaired. In this case 5 strains of Gram-negatives, 3 of Gram-positives and 1 fungus were isolated from cultures of blood and tip of the catheter.

Daghistani and co-workers [1] reported a very low frequency of ICVC-related sepsis. However, a certain percentage of this complication should probably be considered as "physiological", as demonstrated by similar incidence of this complication reported in different studies involving a large number of ICVC [2–5]. However, also the etiology of this complication is important, since in ICVC-related bacteremias due to Gram-negatives and fungi, catheter removal is considered mandatory [9], adding further costs (not only monetary costs) for their management. Therefore every effort should be made to reduce the incidence of infections due to pathogens that require catheter removal. Beyond an indirect demonstration of inappropriate at-home heparin storage as a cause of ICVC-related bacteremias in children with cancer, our study underlines the role of parental skill in managing central venous catheters as a possible cause of this com-

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plication and the need for continuous education also for others involved in catheter management at-home.

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